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Assessing dormant season organophosphate use in California almonds

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Abstract

Organophosphate (OP) pesticides were recommended during the dormant season to control overwintering insects such as peach twig borer, San Jose scale, European red mite, and brown mite in California almond and stone fruit orchards. However, since 1990, dormant OP use had fallen under increased scrutiny due to surface water contamination concerns. Studies have shown positive correlation between OP use and residue load in surface water. The purpose of this study is to assess the trends and regional patterns of OP use in almond orchards, and to identify factors that may have influenced those trends, including weather, pest pressure, and use of alternatives to OP such as pyrethroid, dormant oils, and *Bacillus thuringiensis* (Bt) for the assessment of the impacts to surface water quality. Pesticide use data from the California Department of Pesticide Regulation were analyzed. Regression analyses were used to assess trends from 1992 to 2000, and a geographic information system (GIS) was used to visualize the

spatial variation in pesticide use. Results from this study indicated that, statewide, dormant OP use decreased while the use of some alternatives, such as dormant pyrethroid, no dormant insecticides, and in-season pyrethroid, oil alone, and Bt, increased in the last 9 years. The significant decreasing trend of OP use was observed for the measures of kilogram per hectare crop planted, percentage of total planted hectare treated, and numbers of growers who applied dormant OP. The reduction of dormant OP use appeared in all major almond-growing counties. Correlation analyses revealed that more rain was associated with less dormant OP use. A higher percent of almond damage, or rejects, was related to higher OP use in the following dormant season and in-season periods. However, the effects of weather and percent of nut rejects can only explain small portion of the variations in dormant OP use. Therefore, in addition to weather and pest pressures, economic pressures and various outreach and extension programs may also have played a role in encouraging farmers to reduce their use of dormant OP.



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Keywords

Organophosphate; Pyrethroid; Bt; Dormant spray; Peach twig borer; San Jose scale; Almonds

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